Between priceless and worthless

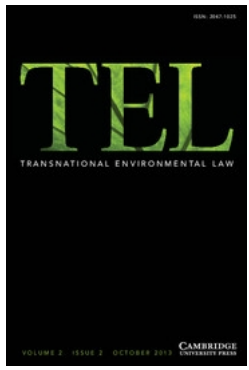
Reid, Colin T.

Published in:
Transnational Environmental Law

DOI:
10.1017/S2047102512000210

Publication date:
2013

Document Version
Publisher's PDF, also known as Version of record



Between Priceless and Worthless: Challenges in Using Market Mechanisms for Conserving Biodiversity

Colin T. Reid

Transnational Environmental Law / Volume 2 / Issue 02 / October 2013, pp 217 - 233
DOI: 10.1017/S2047102512000210, Published online: 28 November 2012

Transnational Environmental Law, 2:2 (2013), pp. 217–233 © 2012 Cambridge University Press
doi:10.1017/S2047102512000210

SYMPOSIUM ARTICLE

Between Priceless and Worthless: Challenges in Using Market Mechanisms for Conserving Biodiversity†

Colin T. Reid*

First published online 28 November 2012

Abstract
There is growing interest in the use of market mechanisms, such as offsetting and payments for ecosystem services, to further the conservation of biodiversity. The specific needs of biodiversity mean that this approach faces significant challenges in terms of defining the units that can be the subject of the economic or market devices, of ensuring that such mechanisms do deliver conservation gains and of establishing appropriate governance arrangements. There are also ethical concerns that a market approach entails a commodification of nature which sacrifices some of the very elements which make nature valuable to us. The market-based schemes currently being operated and devised should be studied carefully to see how successfully these challenges can be met.

Keywords: Biodiversity, Market Mechanisms, Conservation, Biodiversity Offsetting, Ecosystem Services

1. INTRODUCTION

The flora and fauna that we see around us in all their diversity are both priceless and worthless. Determining a financial price cannot wholly capture their aesthetic, spiritual or moral value,[1] whilst if standard economic calculations are attempted, either

† This contribution is part of a collection of articles from the conference 'Regulatory and Institutional Frameworks for Markets for Ecosystem Services', organized by the University of Surrey, School of Law, and the George Washington University Law School, held at the University of Surrey (United Kingdom), 6–7 June 2012.

* University of Dundee, Scotland, United Kingdom (UK).
Email: c.t.reid@dundee.ac.uk.

Thanks to my colleagues Walters Nsoh (AHRC research assistant), Ross Macdonald (Law School), Ariel Bergmann (CEPMLP), Sarah Hendry (IHP-HELP Centre for Water Law, Policy and Science) and to the participants in the workshop on Regulatory and Institutional Frameworks for Markets for Ecosystem Services held at the University of Surrey in June 2012.

1 This statement reveals a simplistic verdict on a large and complex debate on how far various economic methodologies can indeed reflect such non-commercial values and preferences; a convenient summary of the methods used can be found in Chapter 5 of J. Asafu-Adjaye, *Environmental Economics for Non-Economists: Techniques and Policies for Sustainable Development* (World Scientific Publishing Co., 2005), pp. 109–40. See further Section 5 below.

wild animals and plants do not count as property which can be valued at all or, where they are technically items of property, their value is effectively zero.[2] In a world driven largely by money, with markets and interests measured by their economic value, this poses a problem in establishing appropriate mechanisms for conserving the biodiversity that we cherish but which does not feature in such calculations. The failure to feature in these calculations becomes even more of a problem when the regulatory mechanisms that have been adopted to conserve biodiversity are failing to achieve their goal, largely because of pressures on habitat driven by economic considerations.[3] Inevitably, therefore, and in line with the economic and market approach being applied in other areas, attention is being paid to whether market mechanisms can be adapted to further the conservation of biodiversity. There are benefits in this approach, but also dangers, and the special demands of biodiversity conservation mean that great care has to be taken in applying the lessons from other areas.[4] This is as much the case in applying lessons from the use of markets for other aspects of environmental protection as it is in looking at quite different contexts, such as the provision of infrastructure and utilities.

The increasing use in past decades of economic and market instruments as regulatory tools in a wide range of contexts has been well documented,[5] as have been the concerns that in relation to environmental protection this approach involves a fundamental conceptual mismatch.[6] Some of these concerns are discussed in the final section below, but the main aim of this article is to present some of the challenges to be faced if it is decided that the potential for developing market mechanisms should be explored. The challenges raised by the application of this approach in the specific context of biodiversity conservation can be divided into three broad categories. Firstly, there are questions over the definition of the units that can be the subject of the economic or market devices, especially since biodiversity does not share the fungible nature which lies at the root of other environmental markets, such as emissions trading. Mechanisms can be devised for assessing equivalence to enable trade-offs to be made (in other words, to establish a currency), but this exercise demands taking account of many variables, as well as differences between scientific and public perceptions, the dynamic nature of the environment over time and the fact that some features may be irreplaceable. Secondly, there is a challenge in ensuring the effectiveness of any measures to conserve biodiversity.

---

2 Legal systems conventionally hold that wild animals are not owned by anyone (unless and until captured or killed) and, although wild plants may belong to the landowner as a result of the principle of accretion, they are not generally viewed as distinct items of property; separate rules have been developed for dealing with valuable crops: see C.T. Reid, *Nature Conservation Law* (W. Green, 3rd edn, 2009), pp. 16–20, 268–9.

3 Secretariat of the Convention on Biological Diversity, *Global Biodiversity Outlook 3* (CBD, 2010), available at: http://www.cbd.int/gbo3.

4 C.T. Reid, 'The Privatisation of Biodiversity? Possible New Approaches to Nature Conservation Law in the UK' (2011) 23(2) *Journal of Environmental Law*, pp. 203–31.

5 E.g., D. Driesen, 'Alternatives to Regulation? Market Mechanisms and the Environment', in R. Baldwin, M. Cave & M. Lodge (eds.), *The Oxford Handbook of Regulation* (Oxford University Press, 2010), pp. 203–22; N. Gunningham, 'Environmental Law, Regulation and Governance: Shifting Architectures' (2009) 21(2) *Journal of Environmental Law*, pp. 179–212.

6 E.g., M. Sagoff, 'Economic Theory and Environmental Law' (1980–81) 79 *Michigan Law Review*, pp. 1393–419.

This includes consideration of what can actually be achieved by interventions, the extended timescales involved in restoring or enhancing habitat and the need for coherence over time and space if all the needs of particular species or ecosystems are to be met. Ensuring that credit is given only for measures that provide additional gains, over and above 'business as usual', is a further factor. Thirdly, there are questions over the governance of any market-based scheme, including transparency, accountability and the role of the public. Compared to a regulatory system dominated by the state's conservation agencies, market mechanisms may allow scope for a wider range of actors to take the initiative in conservation measures, but may also reduce accountability to the public as vital matters become the subject of private agreements, not public regulation. All these issues are already being addressed by the many initiatives that are applying or considering a market approach to biodiversity,[7] and that experience is worthy of much deeper study.[8] Here, though, the intention is primarily to pose the key challenges which can be tackled in different ways in different contexts.

Given this objective, phrases such as 'market mechanisms' are deliberately imprecise, covering a broad and varied range of different techniques,[9] but the basic challenges are of general relevance. In the discussion that follows, for simplicity the main model that is considered will be a straightforward offsetting scheme whereby, in the same way as those whose activities emit greenhouse gases can offset their emissions by undertaking (directly or indirectly) a reduction in emissions elsewhere, those whose activities cause a loss of biodiversity can offset this by undertaking activities elsewhere that enhance biodiversity in some way. Even within this one main model, further simplification takes place when issues are considered without full regard being paid to the scale of the project being considered. Although the fundamental design questions remain the same, the answers and the way in which they are reached will vary considerably depending on whether one is talking of small-scale schemes allowing a house builder to balance the local impact of a small project or major initiatives providing international recognition and linking gains and losses in different continents. Some consideration is also given to schemes that involve a payment for ecosystem services, a mechanism whereby a source of income is provided to those who, by managing land in a particular way – for example, maintaining

[7] A report in 2010 found '39 existing programs around the world, and another 25 in various stages of development or investigation', representing a 'global market size [of] $1.8–$2.9 billion at minimum': see B. Madsen, N. Carroll & K.M. Brands, 'State of Biodiversity Markets Report: Offset and Compensation Programs Worldwide' (2010), available at: http://www.ecosystemmarketplace.com/documents/acrobat/sbdmr.pdf.

[8] One valuable study is eftec, IEEP et al., 'The Use of Market-Based Instruments for Biodiversity Protection: The Case of Habitat Banking – Technical Report for European Commission DG Environment' (2010), available at: http://ec.europa.eu/environment/enveco/index.htm. See also B.A. McKenney & J.M. Kiesecker, 'Policy Development for Biodiversity Offsets: A Review of Offset Frameworks' (2010) 45(1) *Environmental Management*, pp. 165–76. The different types of economic and market approach to environmental protection that have been or could be applied to biodiversity management is the focus of the author's AHRC-funded project on 'The Privatisation of Biodiversity?', which examines global experience with a view to possible application in the UK.

[9] E. Broughton & R. Pirard, 'What's in a Name? Market-Based Instruments for Biodiversity' (2011) Ifri/IDDRI Analyses No. 03/11, available at: http://www.iddri.org/Publications/Collections/Analyses/AN_1103_MBI_broughton_pirard_EN.pdf.

it in a 'natural' state[10] rather than felling forests, building houses or converting land to intensive agriculture – are providing benefits for the wider community or specific beneficiaries.[11] Again, there are variations on such schemes, each raising its own challenges. Nevertheless, all market-based schemes face similar basic challenges, especially in relation to valuation, even though posing questions of their own on different aspects.[12]

Whatever technique is adopted, an initial question is to establish the objective being sought.[13] When paying for ecosystem services, it is important to define exactly what service is being paid for, especially as these may be difficult to disaggregate. For instance, valuable habitat provided to further biodiversity may also act as a carbon sink. In relation to offsetting schemes, the overall aim should be to ensure 'no net loss' of biodiversity. The gains from the offsetting activities should at least equal, and indeed may exceed,[14] the losses arising from the activities causing harm. One immediate difficulty, of course, is assessing the equivalence of gains and losses,[15] which takes us into the first of the major areas of challenge.

2. BIODIVERSITY UNITS

Market systems need to have a unit of exchange, a currency, so that the participants can be satisfied that they are getting what they regard as a fair exchange when they carry out trades or offsets involving different goods. Satisfaction with a fair exchange is clearly simplest where there is just the one thing that is being traded, a simple exchange of directly equivalent items, although even here there will be differences of time and place that may be significant.[16] The earlier emissions trading schemes were based on a single substance – for example, the Acid Rain Program in the United States

---

10 In many parts of the world what are seen as the 'natural' ecosystems are, in fact, the product of centuries of human intervention and require such intervention to continue if the habitat is to be maintained.

11 For an overview see Katoomba Group et al., *Payments for Ecosystem Services: Getting Started – A Primer* (Forest Trends, The Katoomba Group & UNEP, 2008), available at: http://www.unep.org/pdf/PaymentsForEcosystemServices_en.pdf.

12 Reference is also made to conservation easements (or servitudes or covenants) whereby, as a matter of property law, enduring restrictions are placed on the use of land to further conservation goals. Depending on the details of the scheme – e.g. whether landowners receive benefits in exchange for creating such burdens on their land – these may or may not be regarded as 'market-based', but in their reliance on private initiative rather than direct state regulation they do face at least some of the same challenges.

13 For consideration of different objectives in the context of existing biodiversity law and policy see eftec, n. 8 above, at pp. 210–20.

14 A scheme may insist on this either to provide a margin for error or to contribute to reversing past losses. In Victoria (Australia) an offsetting scheme aims for a net gain, defined as: 'Net Gain is the outcome for native vegetation and habitat where overall gains are greater than overall losses and where individual losses are avoided where possible': Department of Natural Resources and Environment, Victoria, 'Victoria's Native Vegetation Management: A Framework for Action', 2002, at p. 18, available at: http://www.dse.vic.gov.au/__data/assets/pdf_file/0016/102319/Native_Vegetation_Management_-_A_Framework_for_Action.pdf.

15 S. Walker, A.L. Brower, T. Stephens & W.G. Lee, 'Why Bartering Biodiversity Fails' (2009) 2(4) *Conservation Letters*, pp. 149–57; Business and Biodiversity Offsets Programme (BBOP), 'No Net Loss and Loss-Gain Calculations in Biodiversity Offsets', Mar. 2012, available at: http://bbop.forest-trends.org/guidelines/Resource_Paper_NNL.pdf.

16 J. Salzman & J.B. Ruhl, 'Currencies and Commodification of Environmental Law' (2000–01) 53 *Stanford Law Review*, pp. 607–94.

(US) allowing the trading of sulphur dioxide emissions[17] – so that any trade involved a direct setting off of emissions made in one place against the prevention of emissions of the same amount of the same substance elsewhere. Such an approach is straightforward, but clearly has limitations and cannot be used where one wants to take account of anything other than exactly the same substance being emitted in different places or at different times. The development of a common unit of exchange can overcome such limitations: different substances can all be given a value in the one currency providing a single way of measuring the value of different things. This has been achieved in relation to the greenhouse gas trading schemes, where emissions involving a number of gases are all included on the basis of carbon(-dioxide) equivalents,[18] which enable a number of greenhouse gases to be taken into account, thus recognising their different contributions to climate change.[19] The next step is to extend this approach to accommodate a much more disparate range of different elements, converting them all into the same common unit of valuation. In everyday commerce this is done by the use of money.[20]

The fact that acid rain and greenhouse gas schemes have concentrated on a single aspect of the emissions makes the task of establishing a common currency more straightforward, but these schemes share another feature which marks them out from biodiversity examples, namely the essentially fungible nature of the emissions being considered.[21] Although there are also very localized impacts to be considered in controlling emissions,[22] what really counts is the overall state of the atmosphere on a large scale, whether regional or global. This enables an approach that can easily accommodate trade-offs between different sorts of emission at different locations, so long as the overall position remains within the limits set at a broad level. For biodiversity things are different.[23] If damage to undeveloped sand dunes is offset by the creation of new woodland, a very different community of species benefits; measures to create habitat for wetland amphibians do nothing to benefit dolphins displaced by offshore developments. Moreover, some habitats and species may be considered simply irreplaceable.[24] Would it be acceptable to allow the extinction of the giant panda or blue whale in exchange for the effective conservation of areas of Amazonian rainforest?

---

17 See US Environmental Protection Agency website at http://www.epa.gov/airmarkets/progsregs/arp/basic.html.

18 Intergovernmental Panel on Climate Change (IPCC), 'Climate Change 2007: Synthesis Report' (Contribution of Working Groups I, II and III to the Fourth Assessment Report of the IPCC) (2007), Section 2.1.

19 Methane makes a contribution per tonne 25 times that of carbon dioxide: S. Solomon et al., *Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2007), Table 2.14.

20 Salzman & Ruhl (n. 16 above, at p. 614) phrase the challenge in establishing an adequate currency as being: 'can the metric capture the significant values exchanged or do some important features remain external to the trades?'.

21 Salzman & Ruhl (ibid., at p. 612) correctly refer to the 'range of fungibilities' exhibited by the commodities involved in environmental traded markets.

22 Very large emissions of greenhouse gases in one place create an immediate risk to the health of those in the vicinity, not just a contribution to climate change at a global level.

23 See the examples in Salzman & Ruhl, n. 16 above, at pp. 611–2 and Chart 1 at pp. 626–7.

24 BBOP, 'Limits to What Can Be Offset', 20 Mar. 2012, available at: http://bbop.forest-trends.org/guidelines/Resource_Paper_Limits.pdf.

Trying to calculate equivalences and establish a currency for biodiversity is therefore one substantial challenge.[25] Even if one can overcome the major hurdle posed by the lack of adequate baseline data in most situations,[26] the very concept of 'biodiversity loss' is highly contestable since there are so many variables to take into account.[27] The equivalence issue could be avoided by establishing an offsetting scheme that requires a more or less direct match between the harm being done and the beneficial measures taken, requiring like-for-like replacement. This means that damage to a wetland would require the protection or creation of a similar wetland, ensuring that the same specific elements of biodiversity benefit. Such an approach, though, would be very limiting. It is more flexible, although harder to assess, to allow for damage to one sort of habitat to be balanced by support for a quite different but equally (or more) valuable type of habitat – for example, development affecting an estuary used by wading birds might be offset by conservation of native woodland elsewhere. In any event, there are also issues of scale, location and timing to be considered. Given the greater richness of long-established habitat, a larger area of new, enhanced or restored habitat is needed to provide equivalent biodiversity value.[28] The location of a site in relation to other habitats also affects its value and many habitats take a long time to develop and mature; this means, for example, that any new woodland will not achieve substantial biodiversity value for decades, in contrast to the loss of value arising immediately when existing woods are felled.[29]

Scientific assessments and methodologies are being tested and adopted.[30] One straightforward attempt to identify and cater for these variables is provided by the pilot scheme for biodiversity offsetting developed in England by the Department for Environment, Food and Rural Affairs (Defra).[31] This proposes a calculation of biodiversity units being damaged or generated based on a number of variables.[32]

---

25 Walker et al., n. 15 above; BBOP, n. 15 above; Salzman & Ruhl, n. 16 above.

26 Particularly for invertebrates and lower plants, the number of recorded species is often an indication more of the level of recording effort than of the number of species actually present. In the UK, a detailed study over 15 years has recorded 1,782 species of animal and 42 species of plant in one suburban garden in Leicester (J. Owen, *The Ecology of a Garden: The First Fifteen Years* (Cambridge University Press, 1991)), whilst a much shorter and less intensive study of a garden in Dundee has led to the recording of 52 species of hoverfly, 6 species of bumblebee and 170 species of moth (data from Anne Reid). A further consideration here can be an imbalance in the information available to the different parties in any market system: J. Shogren, R.B.W. Smith & J. Tschirhart, 'The Role of Private Information in Designing Conservation Incentives for Property Owners', in J.F. Shogren (ed.), *Species at Risk: Using Economic Incentives to Shelter Endangered Species on Private Land* (University of Texas Press, 2005), pp. 217–32.

27 Some insight into the factors to be taken into account is given in the guidance on compensatory measures required under the Habitats Directive when overriding considerations allow a Natura 2000 site to be damaged: European Commission, 'Guidance Document on Article 6(4) of the "Habitats Directive" 92/43/EEC', Jan. 2007, section 1.5, available at: http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/guidance_art6_4_en.pdf.

28 Ibid., para. 1.5.4.

29 eftec, n. 8 above, Table 4.1.

30 See eftec, ibid., pp. 51–61, 162–8.

31 Department for Environment, Food and Rural Affairs (UK), 'Biodiversity Offsetting Pilots: Guidance for Developers and Guidance for Offset Providers', Mar. 2012 (Defra Guidance), available at: http://www.defra.gov.uk/publications/files/pb13742-bio-guide-offset-providers.pdf.

32 This scheme is very simple compared to some others, e.g. completion of a four-day training course on the BioBanking Credit Calculator is needed to become an assessor under the New South Wales BioBanking Scheme: see http://www.environment.nsw.gov.au/biobanking/calculator.htm.

In determining the harm to be offset, account should be taken of the distinctiveness of the habitat being affected,[33] the existing condition of that habitat (both allocated values on a three-point scale) and the area of land concerned. In addition to the figures generated by those steps, a further element relates to the sort of habitat being provided through the offsetting process, with the loss of habitat of high distinctiveness having to be replaced with other habitat of similar distinctiveness and usually of the same type, while as a separate requirement habitat in medium or poor condition can be replaced only by habitat in high or medium condition. The same elements are used to determine the value of any offset being provided, but additional factors are also to be taken into account. These factors operate as discounting rates, reducing the value initially determined by the calculation based on distinctiveness, condition and area. The difficulty of restoring or recreating the habitat in question must be taken into account,[34] locations that do not fit with wider strategies for biodiversity offsetting should be discounted at set rates, and the length of time before the replacement habitat will be in mature condition attracts a further discount.[35]

Even when there might be acceptance of the scientific basis for the judgments involved in methodologies such as these, there are the further dimensions of balancing local and global concerns and of popular sentiment, which tend to favour large and attractive species over the lower orders[36] of plants and animals. The osprey[37] has a global distribution and is rated as a species of 'Least Concern' in the IUCN Red List,[38] so that its absence from the United Kingdom (UK) after becoming locally extinct in the early 20th century was hardly significant in terms of global biodiversity. Yet that has not prevented it from being viewed as an iconic species in the UK, capturing the public imagination and meriting the utmost protection as it has gradually recolonized Scotland and now other parts of the country.[39] On the other hand, the freshwater pearl mussel,[40] which has its last remaining European stronghold in Scotland, is given little if any thought

---

33 There is a list of habitats and their distinctiveness ratings in an Appendix to the Defra Guidance, n. 31 above.

34 Given the certainty of the habitat loss and the lack of certainty over its successful replacement, one might argue that a strict application of the precautionary principle should rule out accepting any offsets except with retrospective effect.

35 R.K.A. Morris, I. Alonso, R.G. Jefferson & K.J. Kirby, 'The Creation of Compensatory Habitat: Can It Secure Sustainable Development?' (2006) 14(2) *Journal for Nature Conservation*, pp. 106–16. The timing issue is what lies behind the concept of compensatory (as opposed to complementary) remediation under the EU Directive 2004/35/EC on Environmental Liability with Regard to the Prevention and Remedying of Environmental Damage [2004] OJ L143/56.

36 The very terminology, although long-established in taxonomy, embodies prejudices against certain forms of creature and plant.

37 *Pandion haliaetus*.

38 See http://www.iucnredlist.org/apps/redlist/details/106003324/0. Species of Least Concern are 'widespread and abundant': International Union for the Conservation of Nature (IUCN) Red List Categories and Criteria version 3.1, available at: http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria#categories.

39 See, e.g., the Rutland Osprey Project, available at: http://www.ospreys.org.uk.

40 *Margaritifera margaritifera*, listed as 'Endangered' on the IUCN Red List: see http://www.iucnredlist.org/apps/redlist/details/12799/0, and http://jncc.defra.gov.uk/protectedsites/sacselection/species.asp?FeatureIntCode=S1029.

by the public. Grey seals[41] in Scotland are often thought of as abundant and indeed a pest for fishermen and aquaculture.[42] Although also of Least Concern on the IUCN Red List,[43] nevertheless the UK population represents 40 per cent of the global population and 95 per cent of the European, suggesting that they should be especially highly treasured.[44]

Yet more complexity is added by the dynamic nature of the environment. In the face of climate change that may well produce changes in temperature, rainfall and sea level more rapid than those to which we and the current flora and fauna have been accustomed in recent centuries (at least), the very notion of identifying specific locations for habitat becomes problematic.[45] Changing conditions may transform what is currently a favoured location for a particular species into one that is uninhabitable in the future. Especially in view of the long timescale for most habitat restoration or creation, this presents a problem.[46] Yet it also creates an opportunity for offsetting and trading schemes to play an especially valuable role, providing for the conservation, enhancement or creation of the new areas of the habitat that species will need as they are forced to adapt to changing coastlines, or to move towards the Poles or higher ground to find the conditions that they need as temperatures rise.[47]

3. EFFECTIVENESS

Ensuring that any trading or offsetting scheme is effective will also pose a number of challenges. Three of these are considered here, the first two arising from the nature of biodiversity and the third shared with other schemes such as greenhouse gas emissions. The first major challenge is to ensure the physical effectiveness of the measures taken. As the Defra Guidance signals, many forms of habitat restoration or creation are difficult and there is a considerable risk that they will not deliver the benefits hoped for.[48] Indeed, even in relation to the comparatively simple task of translocating species, success

---

41 *Halichoerus grypus*.

42 See Scottish Natural Heritage website at http://www.snh.org.uk/publications/on-line/naturallyscottish/seals/sealsandhumans.asp.

43 See IUCN Red List at http://www.iucnredlist.org/apps/redlist/details/9660/0.

44 See Joint Nature Conservation Committee website at http://jncc.defra.gov.uk/protectedsites/sacselection/species.asp?featureintcode=s1364. Seals in the UK are protected by legislation, notably the Conservation of Seals Act 1970 and Part 6 of the Marine (Scotland) Act 2010.

45 A. Trouwborst, 'International Nature Conservation Law and the Adaptation of Biodiversity to Climate Change: A Mismatch?' (2009) 21(3) *Journal of Environmental Law*, pp. 419–42.

46 For discussion in the context of perpetual conservation easements in the US (see n. 51 below), see J.J. Richardson, Jnr, 'Conservation Easements and Adaptive Management' (2010) 3(1) *Sea Grant Law & Policy Journal*, pp. 31–57; J. Owley, 'Conservation Easements at the Climate Change Crossroads' (2011) 74 *Law and Contemporary Problems*, pp. 199–228.

47 R. Brooker, A. Britton, A. Gimona, J. Lennon & N. Littlewood, *Literature Review: Species Translocations as a Tool for Biodiversity Conservation During Climate Change* (Scottish Natural Heritage, 2011 – Commissioned Report No. 440).

48 Morris et al., n. 35 above; H.L. Mossman, A.J. Davy & A. Grant, 'Does Managed Coastal Realignment Create Saltmarshes with "Equivalent Biological Characteristics" to Natural Reference Sites?' *Journal of Applied Ecology*, Early View online publication 19 Sept. 2012, doi: 10.1111/j.1365-2664.2012.02198.x.

rates vary and success cannot be guaranteed,[49] while poorly designed schemes can do more harm than good.[50]

An additional dimension is that of time. Not only is there the matter of the length of time it may take before habitat matures and delivers substantial biodiversity benefits, but there is also the issue of how effective one should judge offsetting activities where the commitment is not in perpetuity but for a fixed period. Conservation measures that are only temporary may be seen as having little value. On the other hand, a commitment in perpetuity may be of equally little value if conditions change (naturally or as a result of human activity on or near the site) so that habitat no longer serves the purpose it originally did – for example, if a freshwater coastal lagoon is flooded by sea water as a result of rising sea levels.[51] Long-term protection is clearly desirable, but establishing any absolute conditions and restrictions on land use that should operate in perpetuity, regardless of any changes in the natural or human world over the centuries to come, may be taking things too far, so that some degree of flexibility may be desirable.[52]

A second challenge to effectiveness is posed by the need for coherence in biodiversity programmes, something which is not a requirement in other environmental markets such as emissions control. The most successful measure in conserving the winter feeding grounds of migratory wading birds is of no benefit if their summer breeding habitat is destroyed or if the places where they stop and feed on their migration routes are no longer able to support them. Moreover, the ecosystems approach to conservation[53] recognizes that effective conservation requires action taken over a large area, not just the preservation of isolated 'citadels'. The cumulative effect of many individual offsetting deals might add up to very little in terms of effective conservation unless they are closely tied to a coherent overall strategy and set of priorities.[54] This is reflected in the Defra

---

49 B. Griffith, J.M. Scott, J.W. Carpenter & C. Reed, 'Translocation as a Species Conservation Tool: Status and Strategy' (1989) 245(4917) *Science*, pp. 477–80; P.W. Edgar, R.A. Griffiths & J.P. Foster, 'Evaluation of Translocation as a Tool for Mitigating Development Threats to Great Crested Newts (*Triturus cristatus*) in England, 1990–2001' (2005) 122(1) *Biological Conservation*, pp. 45–52.

50 K.H. Hodder & J.M. Bullock, 'Translocations of Native Species in the UK: Implications for Biodiversity' (1997) 34 *Journal of Applied Ecology*, pp. 547–65.

51 This issue has been the subject of considerable attention in relation to conservation easements in the US, where imposing restrictions on land use in perpetuity has been a condition of receiving the tax breaks which have been a main incentive to using this legal mechanism. For examples of the literature see n. 46 above, and J.D. Mahoney, 'Perpetual Restrictions on Land and the Problem of the Future' (2002) 88 *Virginia Law Review*, pp. 739–88; N.A. McLaughlin, 'Conservation Easements: Perpetuity and Beyond' (2007) 34 *Ecology Law Quarterly*, pp. 673–712; R. Brewer, 'Conservation Easements and Perpetuity: Till Legislation Do Us Part' (2011) 74 *Law and Contemporary Problems*, pp. 249–78.

52 As examples, bio-banking agreements under the New South Wales bio-banking are perpetual but can be terminated with ministerial approval (Threatened Species Conservation Act 1995, s. 127G) and conservation burdens in Scotland can be terminated by agreement of the parties or by judgment of the Lands Tribunal (Title Conditions (Scotland) Act 2003, ss. 48, 90–104). In the US, Owley has called for a change from conservation easements in perpetuity to ones which are granted for renewable terms: see J. Owley, 'Changing Property in a Changing World: A Call for the End of Perpetual Conservation Easements' (2011) 30 *Stanford Environmental Law Journal*, pp. 121–73.

53 Convention on Biological Diversity, COP 5 (2000), Decision V/6, para 1. See generally the Ecosystem Approach pages on the CBD website at http://www.cbd.int/ecosystem.

54 A further dimension is coherence with other policies affecting land; e.g., if a site is 'locked in' to certain restrictions to provide a biodiversity offset, this may thwart other land use policies that may contribute to a more sustainable future.

Guidance by the discounting for locations not identified in the relevant offsetting strategy. Moreover, if selection and priorities are left to individual choice and negotiation, there will inevitably be biases, most likely in favour of the large and attractive species over the unglamorous ones, and of the forms of habitat where restoration and creation have proved to be the most straightforward.[55] Such considerations suggest that if market mechanisms are to play a major role in biodiversity conservation, they will have to be highly regulated markets, operating within a very strict framework designed to secure a coherent approach to achieving strategic goals determined outside of the market.[56]

The third challenge for effectiveness is to ensure that the market mechanisms are delivering something more than would otherwise be achieved – what can be termed 'additionality'.[57] Additionality is a major issue in relation to the Clean Development Mechanism (CDM) under the Kyoto Protocol[58] and in this context considerable work has been done to define the concept and investigate whether it is being achieved.[59] 'A CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced to below those that would have occurred in the absence of the registered CDM project activity.'[60] Specific further definitions and guidance are given for different forms of project.[61] Each project must specify how it is additional and this is checked as part of the verification process,[62] yet serious doubts have been raised as to the methodologies used and the effectiveness of the practice in assessing additionality.[63]

In relation to biodiversity there is likely to be even more difficulty, not least because of the measurement and assessment issues discussed above. There is also

---

55 Cf. the way in which 'technology-neutral' incentives for renewable energy in the UK led to a concentration on onshore wind farms as the most mature and easily installed technology: Scottish Executive, '2005–06 Review of the Renewables Obligation (Scotland) Order: Preliminary Consultation' (2005), p. 4.

56 '[Payments for Ecosystem Services] are not first of all about moving from public policies to market allocations. It is more about a reconfiguration of state-market-community relationships': A. Vatn, 'An Institutional Analysis of Payments for Environmental Services' (2010) 69(6) *Ecological Economics*, pp. 1245–52, at 1251.

57 K. Bennett, 'Additionality: The Next Steps for Ecosystem Services Markets' (2010) 20 *Duke Environmental Law & Policy Forum*, pp. 417–38; eftec, n. 8 above, pp. 76–9.

58 Kyoto Protocol to the United Nations Framework Convention on Climate Change (Kyoto Protocol), Kyoto (Japan), 10 Dec. 1997, in force 16 Feb. 2005, available at: http://unfccc.int/kyoto_protocol/items/2830.php.

59 B. Müller, 'Additionality in the Clean Development Mechanism', Oxford Institute for Energy Studies EV 44 (2009).

60 Framework Convention on Climate Change – Meeting of the Parties (2005) 3/CMP.1 Annex para. 43; FCCC/KP/CMP/2005/8/Add.1.

61 The definitions and procedures for different forms of project can be conveniently found in the *CDM Rulebook*, a database prepared by Baker & McKenzie (look under 'Additionality' in the A–Z index), available at: http://cdmrulebook.org/home. This source also provides useful links to the original documents.

62 Clean Development Mechanism: Validation and Verification Manual (Version 01.2): FCCC CDM-EB 55, Annex 1, especially para. 94.

63 A. Michaelowa, 'Interpreting the Additionality of CDM Projects: Changes in Additionality Definition and Regulatory Practices over Time', in D. Freestone & C. Streck (eds.), *Legal Aspects of Carbon Trading: Kyoto, Copenhagen and Beyond* (Oxford University Press, 2009), pp. 248–71, and C. Figueras & C. Streck, 'A Post-2012 Vision for the Clean Development Mechanism', in Freestone & Streck, ibid, pp. 562–82, at 564; L. Schneider, 'Is the CDM Fulfilling Its Environmental and Sustainable Development Objectives? An Evaluation of the CDM and Options for Improvement', report prepared for WWF, 2007, pp. 27–45, 58–61, available at: http://www.thebigask.eu/oekodoc/622/2007-162-en.pdf.

likely to be an interaction with direct controls that exist to prevent certain irreplaceable or otherwise exceptionally valuable habitats from being destroyed. Where such protection is all that is achieved, there is no real gain to be claimed for offsetting against other harms.[64] More difficult to judge is whether other measures are truly an improvement on 'business as usual'. Securing the long-term protection of an area of wetland against development of any sort may be seen as a benefit, but if that area sits next to a landfill site and would require expensive drainage works before any construction or change of use could be contemplated, development is not likely in the foreseeable future and therefore no real additional benefit has been gained. The same question has arisen in various contexts where money is paid in return for steps that prevent damaging activities from taking place, even though there seemed no real likelihood of damaging land use changes actually taking place.[65] This occurred in relation to some conservation easements in the US and in the context of payments for maintaining forest cover in Costa Rica, where the difficulty of assessing additionality and limited achievements are reported.[66] Similarly, at a time when in Great Britain compensation was available for the profit foregone by refraining from operations that would damage a Site of Special Scientific Interest, doubt existed over whether some development proposals were ever seriously intended or had been put forward merely to attract the compensation for the theoretical loss of profit.[67] The biodiversity units that market mechanisms recognize must represent a true gain for biodiversity or else operators are obtaining credit under essentially false pretences.

A further issue may arise when there is more than one scheme in existence, namely that of double counting. If land is being kept in an undeveloped state in accordance with one scheme (for example, as a biodiversity offset) should the same land be eligible to receive payments under another scheme (as a carbon sink, for example)? At first glance, it seems wrong that making use of the land in one way is being paid for twice (especially if this involves public funds going to a private landowner for a use that involves little active management), but on reflection this is no different from the position of a more standard commercial land use which can generate several income streams.[68] Distinct

64 That the offset adds something more than is required under other conservation measures is an explicit requirement of the bio-banking scheme in New South Wales: Threatened Species Conservation (Biodiversity Banking) Regulation 2008, reg. 4.

65 D. Halperin, 'Incentives for Conservation Easements: The Charitable Deduction or a Better Way' (2011) 74 *Law and Contemporary Problems*, pp. 29–50, at 43. The payments in such cases may be direct or through tax breaks which have been identified as the main incentive for such easements to be granted: ibid.

66 A.E. Daniels et al., 'Understanding the Impacts of Costa Rica's PES: Are We Asking the Right Questions?' (2010) 69(11) *Ecological Economics*, pp. 2116–26.

67 Scottish Office, *People and Nature: A New Approach to SSSI Designations in Scotland* (1998), at p. 28.

68 The example given in discussion at the Surrey Workshop was of a farmer growing wheat but receiving income separately for the grain and the straw, sold to different buyers.

'services' are being provided and each should be paid for.[69] Any double reward suggests a flaw in the design of the payment schemes.[70]

4. GOVERNANCE

A further challenge for the development of market mechanisms for biodiversity, as with all markets, is governance.[71] 'Free markets' are never in fact wholly free, but are the product of a range of conscious or unconscious decisions that give them shape; these range from direct regulation of competition and the background rules of property and contract law that enable trades to be made, to even the basics of the rule of law that create an environment where legal rights will be observed and enforced.[72] In relation to biodiversity markets, again three aspects can be highlighted, all arising from the observation that what is being traded, as well as the outcomes of the market, are very much of interest to the wider community and not just those engaged in the market itself. In addition, there will be significant issues of ensuring that any scheme works effectively and efficiently as a market, with trading of a scale and nature that enable the gains of a market approach to be achieved.[73]

The first aspect to highlight is transparency. Since the impact of development on a site of biodiversity value is likely to be obvious to the public (or at least to those sections with the interest and knowledge to appreciate the ways in which ecosystems are being disrupted), the measures being taken to offset this impact should also be visible. As well as reassuring the public that there are appropriate control mechanisms in place, such transparency may be in the developers' own interests, since it reassures people that they are not 'getting away with' damaging the shared natural heritage for private gain. Given the established role of direct public regulation, the potential gains of market mechanisms for biodiversity will only be realized when there is confidence all round that they are in fact effective, operating fairly and that there are benefits to match the losses. In similar vein, those in England who proposed a move away from the public arena of the criminal courts towards the use of civil sanctions as the way of enforcing many regulatory regimes were very clear that this had to be accompanied by robust measures to ensure the transparency of the policies being applied and the actions taken.[74]

---

69 L.A. Wayburn, 'Conservation Easements as Tools to Achieve Regulatory Environmental Goals' (2011) 74(4) *Law and Contemporary Problems*, pp. 175–97, at 196.

70 Such a problem may arise where an initial scheme has been designed to include some implicit recognition for the incidental benefits that come with the main 'service' that is being paid for and subsequently some of those incidental benefits themselves become the subject of distinct schemes: for instance, if direct payments for carbon sequestration are introduced after the establishment of a scheme that pays for conserving habitat that was motivated not only by a narrowly focused assessment of biodiversity benefits but also by an awareness of how such habitats can further wider environmental goals.

71 Reid, n. 4 above, at pp. 225–8.

72 C.R. Sunstein, *Free Markets and Social Justice* (Oxford University Press, 1999), at p. 5; T. Prosser, *Law and the Regulators* (Oxford University Press, 1997), at p. 5.

73 Salzman & Ruhl, n. 16 above, from p. 642; Walker et al., n. 15 above, at pp. 152–4.

74 R. Macrory, *Regulatory Justice: Making Sanctions Effective* (Better Regulation Executive, 2006), Chap. 5. The report's proposals have been enacted as Part 3 of the Regulatory Sanctions and Enforcement Act 2008.

In the European context, such transparency is, in any event, unavoidable in view of wider requirements to secure public access to environmental information. Both the Aarhus Convention[75] and implementing European Union (EU) measures[76] demand that members of the public have access to information relating to the environment, which would encompass at least some details of offsetting or trading deals involving public bodies. Information that is commercially confidential may be withheld.[77] This might cover some aspects of individual trades – for example, how much a developer is paying to support long-term conservation at the offsetting site – but the key elements and operation of the scheme would have to be disclosed. One useful overlap is that, in dealing with transparency, a link can be made with the recording and registration procedures that are highly desirable where any restrictions on land are to have long-term effect, binding the successors of the parties who made the initial deal.[78]

Related to transparency is the issue of accountability. If achieving the public policy goal of preventing further biodiversity loss is to be entrusted to a market scheme and those engaged in it, who is going to be accountable, and how, for the success or failure of that scheme? Success depends on the design of the scheme[79] as well as indications of its effectiveness at the individual level. Do the offsets provided genuinely offer biodiversity gains and are they, as well as the impacts they are offsetting, valued appropriately? In terms of the success of the scheme as a whole, success hinges on securing no net loss to biodiversity or whatever more demanding overall goal has been set. Transparency is one element of this accountability, but it seems likely that some official body will have to be entrusted with the task of monitoring the scheme and its operation. To ensure accountability for the overall impact of conservation offsets, or for the nature and quality of land devoted to offsetting, may take a regulator with a strong oversight role. This poses the difficulty of ensuring that effective oversight does not diminish the flexibility that is a virtue of the market approach.[80]

Again, the Clean Development Mechanism under the Kyoto Protocol may offer some lessons, since it provides for scrutiny of individual deals and reports on the overall position. However, there are concerns over the effectiveness of these measures.[81] Moreover, biodiversity schemes may well operate at a smaller and more local level: the approval

---

75 UNECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, Aarhus (Denmark), 25 June 1998, in force 30 Oct. 2001, available at: http://www.unece.org/env/pp/welcome.html, Arts. 4 and 5.

76 E.g., Directive 2003/4/EC on Public Access to Environmental Information and Repealing Council Directive 90/313/EEC [2003] OJ L41/26.

77 Ibid., Art. 4(2)(d).

78 E.g., in order to be enforceable against successors in title, even fairly short-term management agreements in Scotland have to be registered (Countryside (Scotland) Act 1967, s. 49A), as well as enduring conservation burdens (Title Conditions (Scotland) Act 2003, s. 4). Contrast the position in the US in relation to conservation easements: J.L. Olmsted, 'The Invisible Forest: Conservation Easement Databases and the End of the Clandestine Conservation of Natural Lands' (2011) 74(4) *Law and Contemporary Problems*, pp. 51–82.

79 E.g., in the Defra scheme discussed at n. 31 above, the 'rating' of the habitats and discounting rates applied will make a huge difference to how the scheme operates in practice.

80 Walker et al., n. 15 above, at p. 152.

81 See n. 63 above.

and monitoring processes appropriate for a major renewable energy development project may not be suitable for a housing development of a few hectares. Nevertheless, reporting and monitoring are essential and feature in well-designed schemes.[82]

Both challenges lead on to the third aspect, namely identifying the role for the public. If a significant part of delivering biodiversity policy is to be entrusted to the market rather than state bodies, then the role of the public changes.[83] In some ways it opens up the possibility of more people becoming directly involved in the conservation enterprise, by themselves or through non-governmental or commercial organizations. State conservation bodies will no longer have a monopoly in determining what land is covered by legally binding measures, but instead other parties will determine what sort of offsets should be sought or provided, or which land is put forward for payment schemes, thus influencing the priorities and application of conservation policy far more strongly than the case when everything rests in the hands of public bodies.[84] On the other hand, the transfer of responsibility from state bodies (with well-established means of accountability to the public) to the range of often private bodies engaged in trading and offsetting weakens the link with the public. This is all the more so as a reliance on contractual relationships may well limit the extent to which other parties have standing to enforce the agreement or otherwise intervene,[85] although specific provisions can allow for wider involvement.[86] Especially at present, when the financial crisis has made people very aware of the risks of markets and, in particular, the potential for them to work more for the benefit of the few who are directly involved than for the wider community, the public will seek confidence that the market is indeed an appropriate way of securing the long-term survival of habitats and species.

One complication here is the possible mismatch between what the public sees as important and what biologists do.[87] Whereas the giant panda and the tiger generate huge public goodwill and support, the same cannot be said for less attractive and less well-known species, some of which many members of the public might even be quite happy to see extirpated despite their vital role in the ecosystem, such as snakes and spiders.[88]

---

82 Reporting, monitoring and audit requirements are expressly listed as among the contents of bio-banking agreements in New South Wales (Threatened Species Conservation Act 1995, s. 127E), while the BushBroker and BushTender schemes in Victoria require annual reports from the landowner. See http://www.dse.vic.gov.au/__data/assets/pdf_file/0004/97294/BB_Info_sheet_18_-_Annual_reporting.pdf, and http://www.dse.vic.gov.au/__data/assets/pdf_file/0014/113234/BTInformationsheet16-annualreporting.pdf.

83 Reid, n. 4 above, pp. 226–8.

84 J.D. Echeverria, 'Regulating Versus Paying Land Owners to Protect the Environment' (2006) 26 *Journal of Land, Resources & Environmental Law*, pp. 1–46.

85 Reid, n. 2 above, pp. 25–7.

86 E.g., in New South Wales legislation provides that '[a]ny person may bring proceedings in the Land and Environment Court for an order to remedy or restrain a breach of a bio-banking agreement, whether or not any right of the person has been or may be infringed by or as a consequence of the breach': Threatened Species Conservation Act 1995, s. 127L(1).

87 This is without going into the more specific conflicts that can arise, e.g., over the spread or reintroduction of carnivores such as the wolf or other species which are thought to have a negative impact on aspects of existing land or fisheries management, e.g., the beaver in Scotland.

88 See, e.g., the leader in *The Times* (London, 4 Jan. 1991) and subsequent letters when the adder (*Vipera berus*) was first given statutory protection.

The long-term solution is public education to raise awareness of the value of biodiversity itself and the way in which ecosystems depend on the interaction of many species, large and small, loved and unloved. More immediately, the task must be to ensure that policy and oversight are in the hands of those who neither wholly ignore nor are wholly driven by the public's concerns.[89]

5. CONCERNS OVER COMMODIFICATION

The challenges mentioned so far are ones that are largely practical and which have been and are being actively tackled across the globe. A wealth of work continues to be done on establishing and refining systems for valuing biodiversity and ecosystem services,[90] developing and operating offset markets and schemes of payment for ecosystem services,[91] and reflecting on the strengths and weaknesses of these and other mechanisms involving an element of market or economic approach.[92] But there is a more fundamental challenge to the whole enterprise. This is whether it is morally acceptable to convert the value of biodiversity into economic terms.

The arguments here are not new, as the dominance of a market approach and its application in an increasing range of situations has attracted considerable criticism over the years. Authors such as Hirsch criticized the extension of commercialization into ever more areas of society,[93] whilst Sagoff has been critical of this approach in the environmental field, observing in the US context that '[t]o notice that the Endangered Species Act is not cost-beneficial is to recognize the obvious. That is the *point* of the Act, and of much of our environmental legislation'.[94]

The most recent expression of concern on this question to attract public attention has been Michael Sandel's book *What Money Can't Buy: The Moral Limits of Markets*, published in early 2012.[95] In it he notes that the extension of market thinking into an increasing range of situations in itself changes norms and attitudes,[96] and that this inevitably raises moral concerns. He observes that where deviating from a rule has harmful consequences to others, the introduction of payments for deviation as a means of redressing the balance can be viewed either as a fine for transgression, thus confirming its 'wrongness', or as a fee that permits an exception from the norm, thus altering the

---

89 On the balance between scientific paternalism and popular preferences, see Royal Commission on Environmental Pollution, *Setting Environmental Standards* (21st Report, Cm 4053, 1998), especially Chap. 7.

90 See generally the work of The Economics of Ecosystems and Biodiversity project, available at: http://teebweb.org.

91 See n. 7 above.

92 E.g., the whole of (2011) 74(1) *Law and Contemporary Problems* was devoted to ten articles offering critical analyses of conservation easements in the US.

93 'Commercialization feeds on itself in a way that may retard rather than advance social welfare': F. Hirsch, *Social Limits to Growth* (Routledge & Kegan Paul, 1997), at p. 94.

94 M. Sagoff, n. 6, above, at p. 1418. See also Echeverria, n. 84 above.

95 M. Sandel, *What Money Can't Buy: The Moral Limits of Markets* (Allen Lane, 2012).

96 '[M]arkets change the character of the goods and social practices they govern': ibid., at p. 120.

attitude to the norm itself.[97] Causing the adverse consequences is no longer a wrong but a choice, open to those with the willingness and, importantly, the ability to pay. If the activity being discouraged can be seen as wrongful,[98] the market approach may claim moral neutrality but it inevitably makes implicit judgements:

> When market reasoning travels beyond the domain of material goods, it must 'traffic in morality', unless it wants blindly to maximise social utility without regard for the moral worth of the preferences it satisfies.[99]

As Sandel's book so clearly shows, questions over the 'moral limits of markets' arise from the use of a market approach in many areas of life,[100] and there are no easy answers. One area where conflicting views are reflected in continuing policy debates is in relation to water resources, where a tension exists between the view of water as common heritage and as a commercial resource. On the one hand it is said that:

> [Water] is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such.[101]

On the other hand, it is said:

> Past failure to recognize the economic value of water has led to wasteful and environmentally damaging uses of the resource. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources.[102]

Giving a commercial value to water enables it to be recognized in the economic calculations that dominate so much of the modern world's activities and therefore to be treated as a serious consideration attracting considerable weight. But does 'playing that game' entail the abandonment of another scale by which we can measure and reflect the things that are of value to us as humans? For the conservation of biodiversity, itself declared to be 'a common concern of humankind',[103] does embracing market mechanisms offer an

---

97 The example given is of collecting children from nursery care later than the scheduled time; the introduction of a 'late fee' actually increased the number of late collections as parents saw this as an extra charge for an extra service that was being provided, not as a penalty for an unfair imposition on the staff, an attitude to lateness that persisted even after the payments were removed: ibid., at p. 119, citing U. Gneezy & A. Rustichini, 'A Fine is a Price' (2000) 29(1) *Journal of Legal Studies*, pp. 1–18.

98 His discussion of tradable emissions permits reveals the ambiguities here, since he accepts that emitting carbon is not in itself objectionable, whereas excessive emissions are, and argues that allowing large emitters to buy their way out of changing their wasteful habits reinforces bad attitudes, even though in atmospheric terms it is the total level of emissions, not who is producing them and why, that matters: ibid, pp. 72–9.

99 Ibid., p. 89.

100 In the environmental field Sandel discusses tradable pollution permits, carbon offsets and payments to hunt animals that are endangered (ibid., pp. 72–84). Other examples include priority queues at airports, incentives to lose weight and payments to donate blood and human organs.

101 Para. 1 of the preamble to Directive 2000/60/EC Establishing a Framework for Community Action in the Field of Water Policy (Water Framework Directive) [2000] OJ L327/1.

102 Dublin Statement on Water and Sustainable Development prepared by the International Conference on Water and the Environment (1992), available at: http://www.gdrc.org/uem/water/dublin-statement.html.

103 Convention on Biological Diversity (CBD), Rio de Janeiro (Brazil), 5 June 1992, in force 29 Dec. 1993, available at: http://www.cbd.int/convention/text/, Preamble, para. 3. Cf E. Brown Weiss, 'The Coming Water Crisis: A Common Concern of Humankind' (2012) 1(1) *Transnational Environmental Law*, pp. 158–68.

effective way to fight the pressures that have led to such serious decline, or involve abandoning the very values that make the effort worthwhile?[104]

6. CONCLUSION

Raising these questions does not deny the utility and effectiveness of a market approach in many situations, perhaps some initially surprising ones. There are challenges to overcome if this approach is to be used in relation to environmental policy, but around the world there are many examples of these challenges being taken on. In relation to biodiversity, though, there may be grounds for special caution, since compared to the greater fungibility of greenhouse gas and other emissions, one is dealing with habitats and species that are irreplaceable and that require conservation measures operating with considerable coherence over time and space. Devising market measures that provide effective biodiversity conservation in the long term is challenging.[105] The many local schemes in operation or development around the world give an opportunity to learn from experience, paying due heed to the different legal, social, economic,[106] cultural and physical contexts within which particular schemes operate, and the length of time before success or failure can be properly assessed.[107]

The use of standard regulatory approaches has not been successful in preventing the loss of biodiversity in recent decades. Market mechanisms offer an alternative approach that should be explored, but there are significant challenges in its application to biodiversity conservation. For some people the outcome of fuller consideration may be the acceptance that there is a major role for this approach; for others the practical difficulties or other objections to this way of dealing with our 'common heritage' will rule out almost all application, whilst in-between there will be those who favour carefully designed schemes in well-chosen areas as part of a mixed armoury aiming to halt and reverse the loss of biodiversity. It is clear, though, that we can all benefit from thorough consideration of how well market mechanisms can operate to meet the specific needs of this particular goal, rather than adopting or rejecting them on broader ideological grounds alone.

---

104 L.H. Tribe, 'Ways Not to Think about Plastic Trees: New Foundations for Environmental Law' (1973–74) 83 *Yale Law Journal*, pp. 1315–48.

105 Salzman & Ruhl, n. 16 above, at pp. 693–4. Indeed, to Walker et al. (n. 15 above, at p. 155) the task is so challenging that they conclude that '[a]lthough compensation and no net loss are laudable ideals, ecological and political problems appear intractable, and mean that bartering is likely to achieve more harm than good for biodiversity'.

106 Tax systems can play a major role here; e.g., it is tax breaks which have driven the rapid increase in the use of conservation easements in the US: Halperin, n. 65 above.

107 E.g., anecdotally it is reported that the successors to the landowners who agreed conservation easements in the US are often less supportive of these arrangements than their original creators, who both had the personal motivation to create them and who may have received considerable benefits (usually in the form of tax breaks) in return. The next generation may not share the same motivation and will not themselves be in direct receipt of any tangible benefit in exchange for the restrictions they face, so that more testing challenges to the operation of this mechanism can be expected than during the early years of its widespread use.